



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

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| SITE: | <i>East</i> |
| BREAK: | <i>8, 6</i> |
| OTHER: | <i>vol. 1</i> |

September 27, 2001

MEMORANDUM

SUBJECT: First Five-Year Review Report
Cedartown Municipal Landfill Site
Cedartown, Georgia
GAD980495402

FROM: Mario E. Villamarzo, Chief
AL/GA/MS Section

THRU: Jesse Baskerville, Chief
South Site Management Branch

TO: Richard D. Green, Director
Waste Management Division

Attached please find a copy of the first Five-Year Review Report for the Cedartown Municipal Landfill site in Polk County, Georgia. Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, requires that if a remedial action is taken that results in hazardous substances, pollutants, or contaminants remaining at a site, the Environmental Protection Agency (EPA) shall review such remedial action no less often than each five years after initiation of such remedial action to ensure that human health and the environment are being protected by the remedial action implemented.

The Record of Decision (ROD) for the Site was signed on November 2, 1993. The PRP performed the remedial action which consisted of groundwater monitoring for natural attenuation and maintenance of the landfill cap. The ROD was amended on May 12, 1998. The amended remedy required maintenance of the landfill cap and institutional controls. The action began on November 4, 1994 and was completed on February 25, 1999.

EPA Region 4 has reviewed the report. Based on this review, EPA has determined that the remedial action taken at the site remains protective of human health and the environment. The only deficiency noted in the report is the need for groundwater sampling. The PRP and the State of Georgia have been notified of this need. We are requesting the Division Director's approval of this document.

Approved by: *Richard D. Green*
Richard D. Green, Director

Date: *9/28/01*



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Five-Year Review Report

Cedartown Municipal Landfill Site

(EPA ID #: GAD980495402)

West of N. Tenth Street and Girard Avenue
Cedartown, Polk County, Georgia

Property currently owned by:

City of Cedartown
Polk County, Georgia

Prepared for:

Environmental Protection Agency
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104



Prepared by:

US Army Corps of Engineers
Savannah District
P. O. Box 889
Savannah, GA 31402-0889

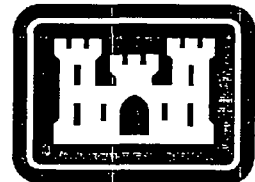


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Five-Year Review Summary Form

| Site Identification | | |
|--|---|---|
| Site name: Cedartown Municipal Landfill Site | | EPA ID: GAD980495402 |
| Region: IV | State: GA | City/County: Cedartown, Polk County |
| Site Status | | |
| NPL status: Deleted from NPL | | |
| Remediation status (under construction, operating, complete): Complete | | |
| Multiple OU's* (highlight): N Number of OU's: 1 | | |
| Construction completion date: 25 February 1999 | | |
| Fund/PRP/Federal facility lead: PRP | Lead agency: EPA Region 4 | |
| Has site been put into reuse? (highlight): <u>N</u> | | |
| Review Status | | |
| Who conducted the review (EPA Region, State, Federal agency): US Army Corps of Engineers | | |
| Author name: Steven Bath | Author title: Environmental Engineer, USACE, Savannah District | |
| Author affiliation: Engineering Division, US Army Corps of Engineers | | |
| Review period: 1 May 2001 – 31 July 2001 | | Date(s) of site inspection: 13 June 2001 |
| Highlight: Statutory or Policy | Policy Type (name): 1. Pre-SARA 2. Ongoing 3. Removal only 4. Regional Discretion | Review Number (1,2, etc.) 1 |
| Triggering action event: First Five-Year Review Completion Date | | |
| Trigger action date: 4 November 1994 | Due date: 1 November 2001 | |

* "OU" refers to operable unit.

Deficiencies:

A ground-water sampling event was not conducted prior to this five-year review as required in the Record of Decision.

Recommendations and Required Actions:

The missed ground-water sampling event should occur as soon as possible. Continue with remedy as stipulated in the amended Record of Decision

Protectiveness Statements:

The remedial actions at operable unit 1 are designed to be protective of human health and the environment. The remedial actions are functioning as intended.

Other Comments:

None

Signature of EPA Regional Administrator or Division Director and Date

Signature



9/28/01
Date

Richard D. Green, Director, Waste Management Division
Name and Title

Cedartown Municipal Landfill Site First Five-Year Review Report

I. Introduction

The United States Environmental Protection Agency (EPA) Region IV has conducted a five-year review of the remedial actions implemented at the Cedartown Municipal Landfill Site in Polk County, Georgia. Technical support for the review was provided by the U.S. Army Corps of Engineers, Savannah District. This review was conducted from May 2001 through July 2001. This report documents the results of that review. The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

EPA conducted this review pursuant the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), NCP section 300.430(f)(4)(ii). Because contaminants remain on site above levels that allow for unlimited use, a Five-Year Review is required. The statutory five-year review requirement was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA). EPA conducts statutory reviews when both of the following conditions are true: 1) upon completion of the remedial action, hazardous substances, pollutants or contaminants will remain above levels that allow for unlimited use and unrestricted exposure; 2) the record of decision (ROD) for the site was signed on or after 17 October 1986 (the effective date of SARA).

This is the first five-year review for the Cedartown Municipal Landfill Site. The trigger for this statutory review is the initiation of the remedial action. Hazardous substances, pollutants, or contaminants will remain onsite for a period exceeding five years. All remedies have been constructed and continue to operate as intended.

II. Site Chronology

Table 1 lists the chronology of events for the Cedartown Municipal Landfill Site.

Table 1: Chronology of Site Events

| Date | Event |
|-------------|--|
| 04/18/1985 | Discovery |
| 04/18/1985 | Preliminary Assessment |
| 03/26/1987 | NPL RP Search |
| 03/26/1987 | Non-NPL PRP Search |
| 05/15/1987 | Site Inspection |
| 10/13/1987 | HRS Package |
| 06/24/1988 | Proposal to NPL |
| 03/31/1989 | Final Listing on NPL |
| 03/30/1990 | RI/FS Negotiations |
| 03/30/1990 | Admin Order on Consent |
| 09/11/1991 | Removal Assessment |
| 11/02/1993 | PRP RI/FS |
| 11/02/1993 | Record of Decision |
| 11/29/1993 | Administrative Records |
| 03/28/1994 | RD/RA Negotiations |
| 05/12/1994 | Unilateral Admin Order |
| 11/04/1994 | PRP RD |
| 09/29/1995 | Admin Order on Consent |
| 06/03/1996 | Explanation Of Significant Differences |
| 05/12/1998 | ROD Amendment |
| 02/25/1999 | PRP RA |
| 03/10/1999 | Deletion from NPL |

III. Background:

The 94-acre Cedartown Municipal Landfill site is located on the outskirts of the City of Cedartown, Polk County, GA, approximately 62 miles NW of Atlanta. The site location and site plan (copied from the Two-Year Evaluation Report) are shown on Figures 1.1 and 1.2 at the end of this report. The site encompasses a former iron mine, which subsequently was used as a municipal landfill. Property to the east of the site consists of an industrial complex, while land to the north, south, and west is a mixture of residential, agricultural, and undeveloped land. The site is primarily covered with dense vegetation, which limits access.

The site was used as a solid waste sanitary landfill, receiving industrial waste sludge, animal and vegetable fats and oils, liquid dye wastes, latex paint, and plant trash. It was closed in 1979 with a 1-12 ft clay cap and vegetative cover. The site was proposed for the NPL in 1988 and finalized in March 1989. The Cedartown Municipal Landfill Potentially Responsible Party (PRP) Committee completed the RI/FS in 1993 pursuant to EPA Administrative Order of Consent in 1990.

The site was listed on NPL due to the potential for ground water contamination. The aquifers of concern for the site were the Newala Limestone and the Knox Formations. Cedartown Spring, which supplies potable water for the City of Cedartown, has its geologic source in the Newala Limestone formation and has a flow volume of 3.9 mgd. Both the Knox and Newala formations outcrop within 3 miles of the site; therefore, both are considered to be the aquifers of concern. The Knox Group is widely used in Polk County as a source of potable water.

The selected remedial alternative addressed contaminated ground water and contaminated leachate. Pathways of exposure include ingestion of ground water and exposure to surface waters. The state concurs with the selected remedy.

IV. Remedial Actions:

A. Remedy Selection;

The selected Remedial Action (RA) at this site includes: maintaining the cover and seep controls, deed restrictions and land use restrictions, surface-water monitoring; natural attenuation, ground-water monitoring, and a two year review. If continued monitoring indicates that natural attenuation is not effective, a contingency Remedial Action to extract and treat the ground water with a "to be determined" technology will be implemented with off-site discharge. The overall present worth costs are \$625,000. The total O&M costs are \$615,000 and the O&M duration is 30 Years.

Major components of the selected remedy, as stipulated in the Record of Decision, include:

- Cover maintenance and seep controls;
- Institutional controls, such as record notices and deed, zoning, and land use restrictions;
- Ground and surface-water monitoring program to ensure that natural attenuation processes would be effective and that contaminants would not migrate;
- A two year review during which EPA would determine whether ground-water performance standards continue to be appropriate and if natural attenuation processes are effective;

- A contingency Remedial Action which includes ground-water extraction, on-site treatment, and discharge under National Pollution Discharge Elimination System (NPDES) to nearby surface water or POTW;
- Continued ground-water monitoring upon attainment of the performance standards at sampling intervals to be approved by EPA until EPA approves a five year review concluding that the alternative has achieved continued attainment of the performance standards and remains protective of human health and the environment.

Based upon the Administrative Record, the requirements of the CERCLA and the NCP, the detailed analysis of alternatives, and consideration of public and state comments; the EPA selected an amended remedy for this site. The selected cleanup alternative to reduce to levels protective of human health and the environment posed by contamination found at the Cedartown site involves implementation of institutional controls to restrict ground-water use in the areas where performance standards are exceeded, and maintenance of the landfill cover. Ground-water monitoring would not be continued since existing data have demonstrated that contamination is not migrating away from the site. In addition, this Record of Decision Amendment removes the contingency action of pump and treat. EPA would conduct a five-year review to determine if the remedy remained protective of human health and the environment. Estimated Cost: \$5,000.

Major components of the amended remedy, include:

- Maintenance of the landfill cover;
- Institutional controls to restrict ground-water use beneath and immediately surrounding the site;
- Removal of the requirement for ground-water monitoring and the pump and treat contingency.

This remedy addresses the first and final cleanup action planned for the site. The ground water beneath the site contains elevated levels of contaminants similar to that present in waste and leachate at the site. The purpose of this proposed action is to prevent current or future exposure to landfill waste and contaminated ground water and to reduce the migration of contaminants.

B. Remedy Implementation;

- Deed restrictions and site access restrictions have been placed in effect as stipulated by the Record of Decision.
- Landfill cover and seep inspections were conducted semi-annually for the duration of the RA program.

- Monitoring data collected quarterly during the RA revealed that the only COC consistently detected in some of the perimeter monitoring wells is Manganese. Analysis of the ground-water data revealed three perimeter monitoring wells have a statistically significantly higher concentration of Manganese than the pooled mean Manganese concentration from interior monitoring-wells. This indicates the concentrations of Manganese detected are not a result of landfill activities but are naturally occurring. The summary of these data may be viewed in Appendix C of this document.
- Based on the results of ground-water monitoring, the ROD was amended to remove the requirements for ground-water monitoring and the pump and treat contingency.
- This document is the first of the five-year reviews to be prepared. Thus, this condition of the Record of Decision is being fulfilled.

C. System Operations;

Work at the site has been funded by the Potentially Responsible Party, Cedartown Municipal Landfill Site Group, with oversight by not only the US EPA but also the Georgia Environmental Protection Division (GAEPD).

D. Progress Since the Last Five-Year Review;

Since this is the first 5-Year Review Report, no other report is available and thus no progress is reportable.

V. Five-Year Review Process:

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. Where remedial actions are still under construction, a five-year review should confirm that immediate threats have been addressed and that EPA expects the remedy to be protective when all remedial actions are complete. A five-year review does not reconsider decisions made during the selection of the remedy, but evaluates the implementation and performance of the selected remedy.

In some cases, a five-year review can recommend that the remedy be re-evaluated or that additional response actions be considered. One example is when a remedy will not meet cleanup levels for a contaminant of concern. Another is when a contaminant, source, or pathway of exposure is newly identified. Finally, a five-year review may recommend that the remedy be re-evaluated when a contaminant, source, or pathway has not already been sufficiently addressed.

Five-year reviews include recommendations to ensure that a remedy will be or will continue to be protective and to address any deficiencies identified through the review. The results of the review, including the protectiveness of the remedial actions and the recommendations, are presented in a five-year review report. Finally, EPA reports the results of the review to Congress.

A five-year review may be required when a remedy is selected under §121 of the Comprehensive Environmental Response, Compensation, and Liability Act or if portions of §121 are used in conducting a remedy, such as the use of the permit exclusion. A five-year review may also be required for a removal-only site on the National Priorities List. Key considerations for whether a review is required include the following:

- Whether hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure;
- The length of time that they will remain above these levels;
- For remedies selected under CERCLA §121, whether they were selected before or after the effective date of the Superfund Amendments and Reauthorization Act of 1986.

VI. Five-Year Review Findings:

A. Interviews:

On 12-13 June 2001, Phil Smith, Geotechnical Engineer and Steven Bath, Environmental Engineer, both with the US Army Corps of Engineers (USACE), Savannah District, visited the Region IV offices of the US Environmental Protection Agency to view the Administrative Record and associated documents pertaining to the Cedartown Municipal Landfill site. Mr. David Johnson, City Manager, City of Cedartown, was interviewed in Cedartown on the afternoon of 13 June 2001. He has been directly involved with the remediation and monitoring activities at the site. Mr. Johnson discussed the current situation of the site and provided personnel from his staff to escort us through the site.

No other individuals familiar with the site and its status were interviewed.

B. Site Inspection:

An inspection of the Cedartown Municipal Landfill was performed by Steve Bath and Phil Smith on 13 June 01. We were provided access and accompanied by city personnel while at the site. The majority of the site was visually inspected. Some areas, even though within the limits of the landfill, were never used for filling. Most of these areas were heavily wooded and were not inspected. The areas inspected were generally those where the landfill cap had been placed. Most of the areas inspected were over grown with weeds, woody vegetation, and/or small trees. These conditions can be seen in some of the photos attached to this

report. See attachment B for photos. The areas with heavier vegetation were difficult to inspect for deficiencies such as cracks or depressions. Typically, landfill cover maintenance includes periodic cutting of vegetation and control of erosion. In areas that were easily visible for inspections, the cap appeared to be in good condition. No significant erosion was observed.

The Record of Decision required periodic inspection and surface-water sampling of a seep west of the Coke Pond. The seep could not be located during the inspection. It is believed that the seep may be dry or much less visible than in the past due to very low rainfall over the last two years. It is also possible, the seep has been hidden by woody vegetation. Many of the monitoring wells were observed during the inspection. The protective casings appeared to be in good condition. The protective casings for monitoring wells LW-3, LW-4, OW-5, and OW-4 are shown on the photos in attachment B.

Several small bare areas were observed on the landfill cap. Two of the bare areas are shown on the photos in attachment B. These areas did not appear to be eroding to any significant degree. The bare areas are mostly located on access roads across the site. The largest bare area and several smaller bare areas are located between monitoring wells LW-4 and LW-2 (see figure 1.2). Other small bare areas were observed on the eastern slope in the vicinity of monitoring wells CL-08-WP and CL-08-WT. The lack of vegetation cover is believed to be due to the densely compacted cap material and vehicle traffic.

Access to the site is limited by fences, barricades, and heavily vegetated areas and trees. There are generally no avenues of ingress for unauthorized vehicles.

Up until the two-year review in December 1996, maintenance was being performed on the cover, and the site was inspected bi-annual by city personnel. However, the site has since been taken off the NPL and no cap maintenance or inspections have been performed since.

Even though the site has been taken off the NPL, as long as contaminants remain on the site above levels that allow for unlimited use, five-year reviews along with a ground-water sampling event are still required by statute. In addition, the Principle Responsible Parties agreed to conduct site maintenance and monitoring events in accordance with the operation and maintenance plan as requested by the State of Georgia, Department of Natural Resources (GADNR).

C. Risk Information Review:

The following applicable or relevant and appropriate requirements (ARARs) were reviewed for changes that could affect protectiveness of the selected remedy:

- Safe Drinking Water Act (40 CFR Parts 141 and 143);
- Resource Conservation and Recovery Act (40 CFR Part 257 - 264);
- Clean Water Act (40 CFR Parts 131, 141, 144, and 403);

- Clean Air Act (40 CFR Parts 50 and 61);
- Georgia Drinking Water Regulations - Chapter 391-3-5;
- Georgia Water Quality Control Regulations and Standards;
- Georgia Air quality Act;
- Georgia Water Well Standards;

Per EPA Guidance, only those ARARs that address risk posed to human health or the environment need be reviewed.

A comparison of current standards against those listed in the RODs was performed. The following table presents the ROD standards and current standards for comparison.

Table: 2 Changes in ARARS

| Changes in Chemical-Specific Standards | | | | |
|---|---|----------------------------|----------------------------------|-----------------------------|
| COC | Standard as Stated in ROD | Current Federal MCL | Current Georgia State MCL | Changes in Standards |
| Manganese ¹ | Original RBC-175 ppb Revised in 1996 RBC- 840 ppb | None | 50 ppb | PRG-880 ppb |
| Beryllium | Fed MCL – 4 ppb | 4 ppb | 4 ppb | None |
| Cadmium | Fed MCL – 5 ppb | 5 ppb | 5 ppb | None |
| Chromium | Fed MCL – 100 ppb | 100 ppb | 100 ppb | None |
| Lead | EPA Action Level – 15 ppb | Action Level = 15 ppb | 15 ppb | None |

¹ – The Risk Based Concentration (RBC) for Manganese was changed as the result of a revision to the established Reference Dose. In June 1996, an Explanation of Significant differences changed the Manganese performance standard for the Cedartown Municipal Landfill to 840 ppb. Currently the risk based Preliminary Remediation Goal (PRG) for Manganese as calculated by EPA is 880 ppb.

Based on the current status of the Site, no changes were discovered between the original ARARs cited in the Record of Decision and the current statutes and regulations that would apply to the remedial action. This applied to both the chemical-specific ARARs and to the location-specific ARARs. Although concentrations on Manganese repeatedly exceed the

performance standards, they are within the range of naturally occurring Manganese near the site.

D. Data Review

Documents reviewed for this report included the Record of Decision, Remedial Investigation Report, Feasibility Study Report, Two-Year Evaluation Report, Remedial Action Construction Report, and various memorandum and letter correspondence.

Review of Historic Ground-Water Concentrations

The data collected during the Remedial Action and presented in the Remedial Action Construction Report and in the Two-Year Evaluation report were the main source of data evaluated for this report. Eight rounds of ground-water monitoring occurred between January 1995 and October 1996. No ground-water monitoring has occurred since October 1996. Table 3 provides a summary of the minimum and maximum concentrations for the contaminants of concern for the sampling interval listed above. The following information and data, copied from the Two-Year Evaluation Report, are enclosed in Attachment C:

Figure 3.1 Monitoring Well Network Plan

Table 3.1 Construction Details for Monitoring Well Network

Table 4.1 Groundwater Elevation Summary

Table 5.1 Groundwater Metals Results for Background Monitoring Wells

Table 5.2 Groundwater Metals Results for Interior Monitoring Wells

Table 5.3 Groundwater Metals Results for Perimeter Monitoring Wells

Figure 5.1 Manganese Distribution

Figure 6.1 Manganese Concentration vs. Time OW-1

Figure 6.2 Manganese Concentration vs. Time OW-3

Figure 6.3 Manganese Concentration vs. Time OW-4

Since no monitoring events have occurred since the Two-Year Evaluation Report, the data presented in Appendix C is not regenerated specifically for this report.

As can be seen in Tables 5.1, 5.2, and 5.3, there were relatively few chromium and lead concentrations in the samples tested that were above the performance standards. All chromium concentrations above the performance standard were in the interior monitoring wells. There were only two tests results where the lead concentrations were above the performance standard, both in interior monitoring well CL-07-WP.

**Table 3: Summary Remedial Action Monitoring
Ground-Water Sampling Results**

| COC | Beryllium | Cadmium | Chromium | Lead | Manganese |
|--|-----------|---------|----------|------|-----------|
| Performance Standard (ug/L) | 4.0 | 5.0 | 100 | 15.0 | 880.0 |
| Number of Detections | 0 | 0 | 6 | 4 | 55 |
| Minimum Concentration (ug/L) Interior Wells | | | | | |
| CL-05-WP | ND | ND | ND | ND | 127.0 |
| CL-06-WP | ND | ND | ND | ND | 20.4 |
| CL-07-WP | ND | ND | 23.0 | 11.3 | 27.4 |
| Minimum Concentration (ug/L) Background Wells | | | | | |
| CL-09-WP | ND | ND | ND | ND | ND |
| OW-7R | ND | ND | ND | ND | ND |
| OW-6B | ND | ND | ND | ND | ND |
| Minimum Concentration (ug/L) Perimeter Wells | | | | | |
| OW-1 | ND | ND | ND | ND | 16.4 |
| OW-2 | ND | ND | ND | ND | 285.0 |
| OW-3 | ND | ND | ND | ND | 11.4 |
| OW-4 | ND | ND | ND | ND | 193.0 |
| CL-03-WP | ND | ND | ND | ND | ND |
| CL-04-WP | ND | ND | ND | ND | ND |
| OW-5 | ND | ND | ND | ND | ND |
| Maximum Concentration (ug/L) Interior Wells | | | | | |
| CL-05-WP | ND | ND | ND | ND | 2,460.0 |
| CL-06-WP | ND | ND | 423.0 | 4.6 | 888.0 |
| CL-07-WP | ND | ND | 398 | 26.8 | 810.0 |
| Maximum Concentration (ug/L) Background Wells | | | | | |
| CL-09-WP | ND | ND | ND | ND | 23.4 |
| OW-7R | ND | ND | 10.1 | 11.0 | 491.0 |
| OW-6B | ND | ND | 16.2 | 5.0 | 296.0 |
| Maximum Concentration (ug/L) Perimeter Wells | | | | | |
| OW-1 | ND | ND | 10.4 | ND | 4,180.0 |
| OW-2 | ND | ND | ND | ND | 1,170.0 |
| OW-3 | ND | ND | ND | ND | 4,990.0 |
| OW-4 | ND | ND | ND | ND | 5,740.0 |
| CL-03-WP | ND | ND | ND | ND | 72.6 |
| CL-04-WP | ND | ND | ND | ND | 19.7 |
| OW-5 | ND | ND | ND | ND | 10.8 |

Note: ND indicates concentrations were below reported detection limits

Additional discussion of sample results for the contaminants of concern follows.

Beryllium: For all of the RA monitoring events, concentrations of Beryllium in both interior and perimeter monitoring wells were below the reported detection limit.

Cadmium: For all of the RA monitoring events, concentrations of Cadmium in both interior and perimeter monitoring wells were below the reported detection limit.

Chromium: Chromium was detected several times in two interior monitoring wells, CL-06-WP and CL-07-WP, once in a background monitoring well, OW-6B, and once in a perimeter monitoring well, OW-1. The concentration of Chromium detected in the background well and in the perimeter well, 16.2 and 10.4 ug/L respectively, were below the performance standard of 100 ug/L. Concentrations in the interior wells did exceed the performance standards. This indicates natural attenuation is preventing the Chromium from migrating off the site.

Lead: Lead was detected in each of the interior monitoring wells at least once during RA monitoring. Concentration range from 3.0 ug/L to 26.8 ug/L. There were only two test results, both in interior monitoring wells, that were above the performance standard. None of the perimeter monitoring wells contained lead during any of the RA sampling events.

Manganese: In November 1995, the performance standard for manganese was changed by the EPA from 175 ug/L to 840 ug/L; thus, the regulatory limit for the Cedartown Municipal Landfill site was also changed. Manganese was consistently detected in perimeter monitoring wells during Remedial Action monitoring. Concentrations of Manganese in monitoring wells OW-1, OW-3, and OW-4 significantly exceeded the regulatory limit. Concentrations of Manganese detected at the site, however, are lower than the concentrations naturally occurring in the region surrounding the site.

VII. Assessment

The following conclusions support the determination that the remedy at the Cedartown Municipal Landfill Site remains protective of human health and the environment:

Question A: Is the remedy functioning as intended by the decision documents?

- ***HASP/Contingency Plan:*** The Health and Safety Plan (HASP) has been in place for all sampling events and has been sufficient to control risk for those entering the site. The contingency plan requirement was removed by the amendment to the ROD.
- ***Implementation of Institutional Controls and Other Measures:*** Deed restrictions and restrictive covenants in addition to site access restrictions (fencing and signage) are currently in place to ensure only those authorized to visit the site are able to gain access to the site.
- ***Remedial Action Performance:*** The remedies stipulated and agreed to in the Record of Decision are performing as planned. However, to be in complete conformance with the Record of Decision, a ground-water monitoring event is necessary for the Five-Year Review. The results of the event, when available, should be amended to this report. The

Five-Year Review Report should also be amended if warranted by the ground-water monitoring test results.

- ***Adequacy of System Operations:*** System operations procedures are consistent with requirements. A ground-water monitoring event should occur prior to every five-year review.
- ***No Need for Optimization:*** In view of the results of the sampling through 1996, this five-year review does not identify a need for any optimization.
- ***No Early Indicators of Potential Remedy Failure:*** No indicators of potential remedy failures were noted during the review process and the site visit.

Question B: Are the assumptions used at the time of the remedy selection still valid?

- ***Changes in Standards and To be Considered:*** Based on the current status of the site, no changes were discovered between the original ARARs cited in the Record of Decision and the current statutes and regulations that would apply to the remedial action. This applied to both the chemical-specific ARARs and to the location-specific ARARs. Although concentrations on Manganese repeatedly exceed the performance standards, they are within the range of naturally occurring Manganese near the site.
- ***Changes in Exposure Pathways:*** No new contaminants, sources, or exposure pathways were identified as part of this five-year review. There are no current or planned changes in land use that would affect exposure pathways at the site. No discrepancies were detected in the hydrologic/hydrogeologic characterization of the site. At the time of the last sampling event (October 1996), the rate of decrease of contaminant levels in ground water was consistent with expectations at the time of the ROD. Based on an amendment to the ROD, ground-water monitoring is not currently required at the site.
- ***Changes in Toxicity and Other Contaminant Characteristics:*** The Risk Based Concentration (RBC) for Manganese was changed as the result of a revision to the established Reference Dose. In June 1996, an Explanation of Significant differences changed the Manganese performance standard for the Cedartown Municipal Landfill to 840 ppb. Currently, the risk based PRG for Manganese as calculated by EPA is 880 ppb. Manganese occurs naturally at the site at concentrations exceeding the PRG.
- ***Changes in Risk Assessment Methodologies:*** RBCs as calculated by EPA Region 3 consider ingestion as the only exposure pathway. The risk based PRGs calculated by EPA Region 9 consider several exposure pathways and are therefore more protective of human health. This change in risk assessment methodologies since the time of the ROD does not call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that would call into question the protectiveness of the remedy.

VIII. Deficiencies:

No deficiencies were discovered during the site-review. The remedy is working both as designed and as expected.

IX. Recommendations:

Table 4: Recommendations;

| Recommendations/ Required Actions | Party Responsible | Oversight Agency | Milestone Date | Required Actions: Currently Affects Protectiveness (Y/N) |
|---|------------------------------|-----------------------------|---------------------------|---|
| Conduct required ground-water monitoring | PRP | EPA | As soon as possible | Yes |
| Continue with remedy as stipulated in the Record of Decision including ground-water monitoring for the Five-year Review | PRP | EPA | 5-years | Yes |

X. Protectiveness Statements:

Because the remedial actions at all operable units are protective, the remedy for this site is protective of human health and the environment.

XI. Next Review:

Providing no changes are forthcoming with respect to sampling and analyses, the next five-year Review would be scheduled no later than July 2006.

XII. Other Comments

In view of the decline in contaminant concentrations throughout the property over an extended period of time, institutional controls appear sufficient to maintain the property and to allow further biodegradation of residual, remaining contaminants. Ground-water monitoring every five years will ensure the remedy remains protective.

Based on our review of documents and discussion with Mr. Johnson, The City of Cedartown currently does not have any guidance concerning maintenance of the landfill cover and maintenance of institutional controls to limit access to the site. The original requirements for maintenance of the cover and maintenance of site barriers, as specified in the amended ROD, were removed when the site was taken off the NPL. However, maintenance should continue in accordance with the existing operation and maintenance plan or as directed by GADNR. Visual inspection of the landfill cover will continue to be severely impeded without routine maintenance.

Attachments

- Attachment A: Documents Reviewed
- Attachment B: Images Documenting Site Conditions
- Attachment C: Pertinent Data From Two-Year Evaluation Report

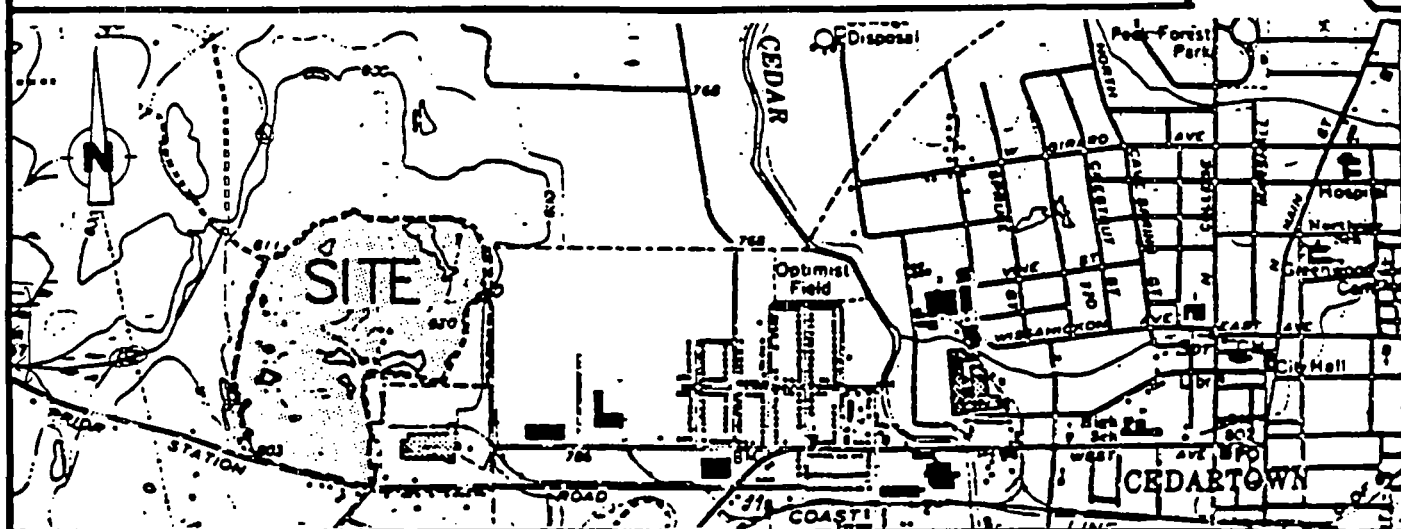
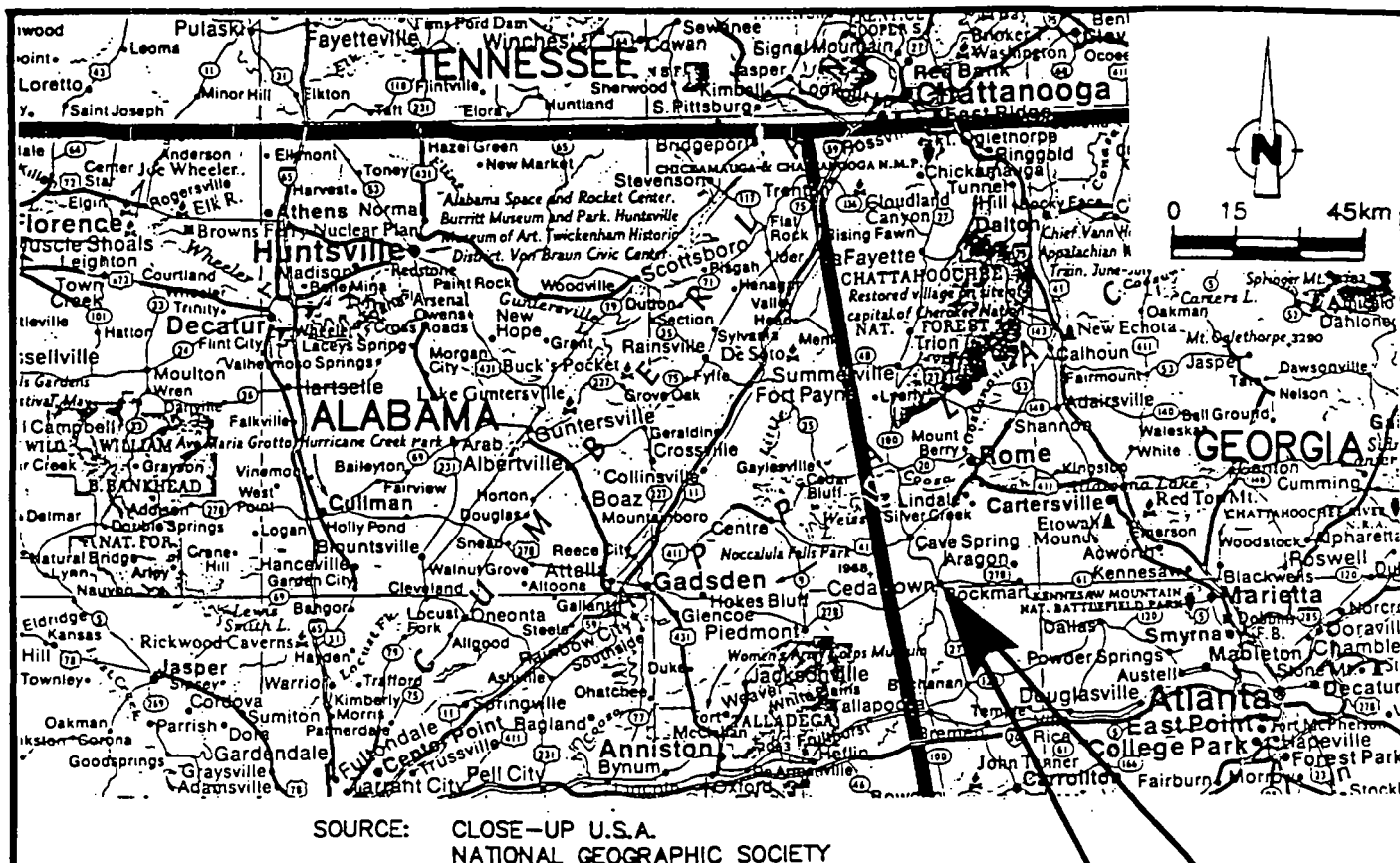
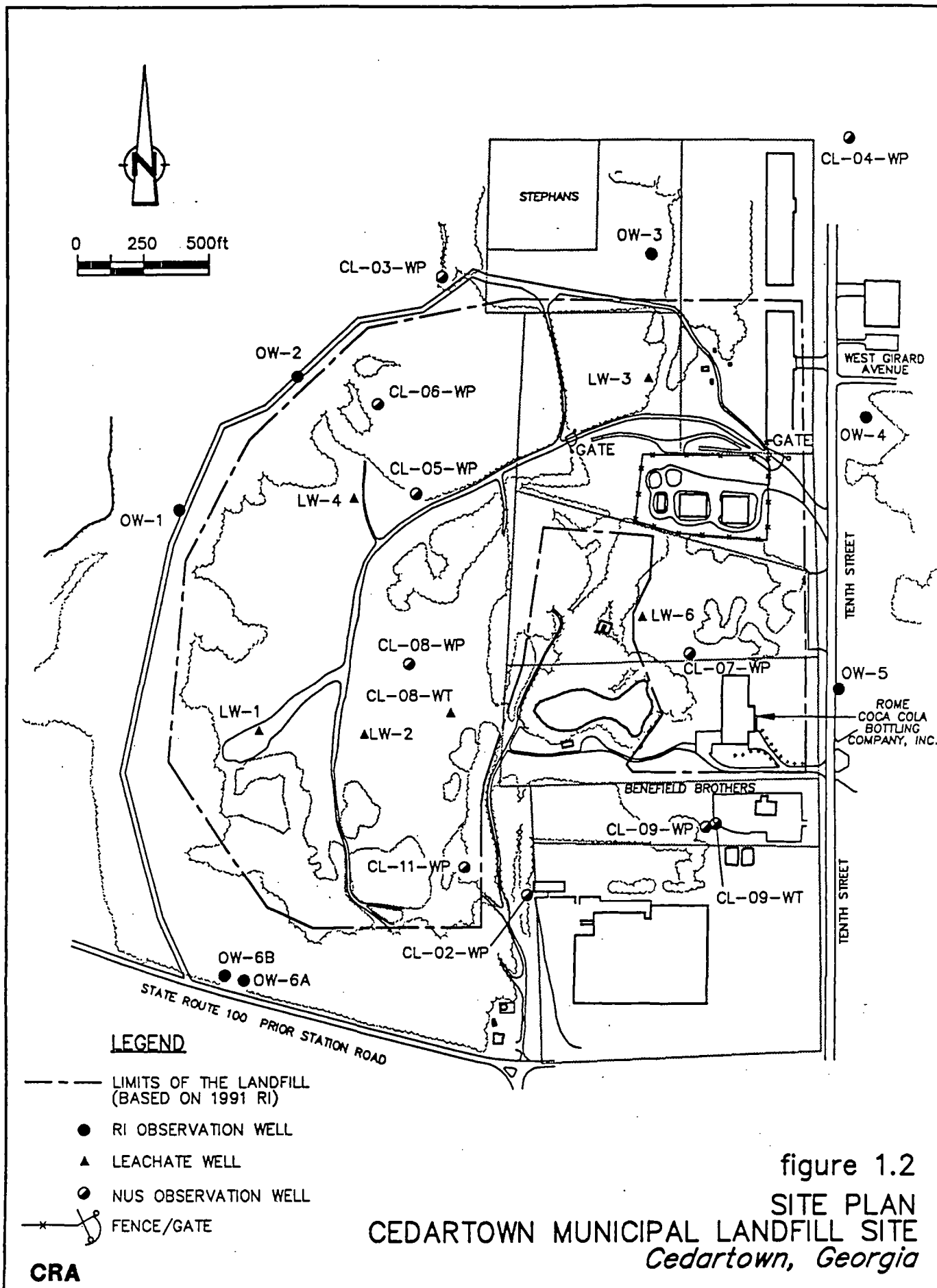


figure 1.1
SITE LOCATION
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA



Attachment A

Documents Reviewed

Bibliography

ChemRisk, A Division of McLaren/Hart, *Review of the Cedartown Municipal Landfill RI and Baseline Risk Assessment Report for Manganese, Cedartown, Georgia, Cleveland, Ohio*, September 1993

Conestoga-Rovers & Associates, *Remedial Investigation (RI) Report, Cedartown Municipal Landfill Site, Cedartown, Georgia, Waterloo, Ontario, Canada*, June 1992.

Conestoga-Rovers & Associates, *Feasibility Study (FS) Report, Cedartown Municipal Landfill Site, Cedartown, Georgia, Waterloo, Ontario, Canada*, August 1993.

Conestoga-Rovers & Associates, *Two-Year Evaluation Report, Cedartown Municipal Landfill Site, Cedartown, Georgia, Waterloo, Ontario, Canada*, December 1996.

Conestoga-Rovers & Associates, *Remedial Design / Remedial Action Progress Reports, Cedartown Municipal Landfill Site, Cedartown, Georgia, Waterloo, Ontario, Canada*.

US Environmental Protection Agency, Region IV, *Record of Decision, Summary of Remedial Alternative Selection, Cedartown Municipal Landfill Site, Cedartown, Polk County, Georgia*, dated 11/2/93.

US Environmental Protection Agency, Region IV, *Proposed Plan Fact Sheet for Record of Decision Amendment, Cedartown Municipal Landfill, Cedartown, Georgia*, March 1998.

US Environmental Protection Agency, Region IV, *Amended Record of Decision, Summary of Remedial Alternative Selection, Cedartown Municipal Landfill Site, Cedartown, Polk County, Georgia*, dated 5/12/98.

US Environmental Protection Agency, Region IV, *Superfund Preliminary Close Out Report, Cedartown Municipal Landfill Site, Cedartown, Polk County, Georgia*, August 1996.

Numerous other letters, memoranda, and reports provided by EPA, Region IV personnel, especially Mrs. Annie Godfrey,

Attachment B

Images Documenting Site Conditions



Photograph: Coke Pond

Project Name: Cedartown Municipal Landfill Superfund Site



Photograph: Monitoring Well LW-3

Project Name: Cedartown Municipal Landfill Superfund Site



Photograph: Landfill cover near LW-2

Project Name: Cedartown Municipal Landfill Superfund Site



Photograph: Small area of surface erosion on eastern slope

Project Name: Cedartown Municipal Landfill Superfund Site



Photograph: Monitoring Well LW-4

Project Name: Cedartown Municipal Landfill Superfund Site



Photograph: Landfill cover near LW-4

Project Name: Cedartown Municipal Landfill Superfund Site



Photograph: Monitoring Well OW-5

Project Name: Cedartown Municipal Landfill Superfund Site

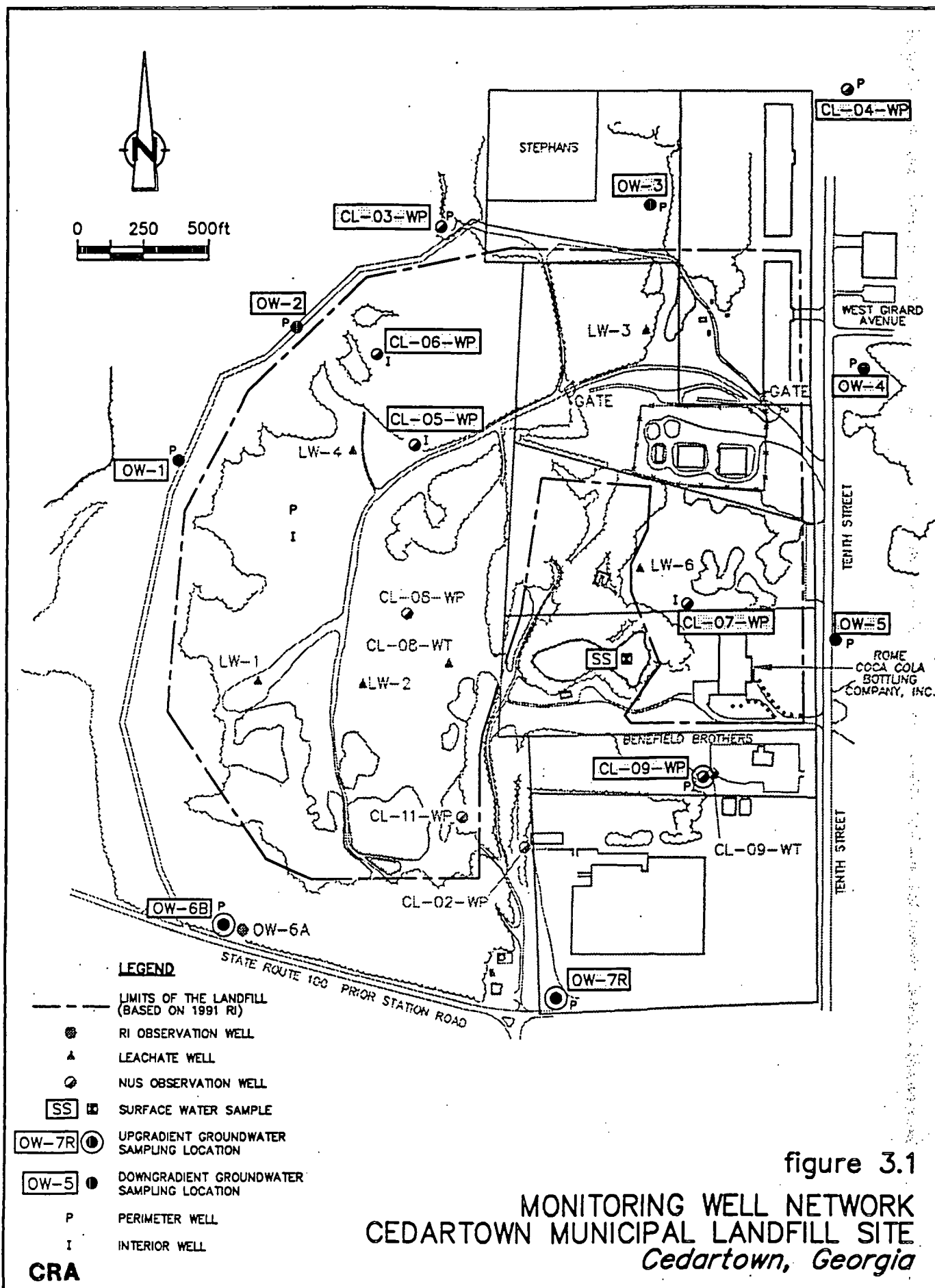


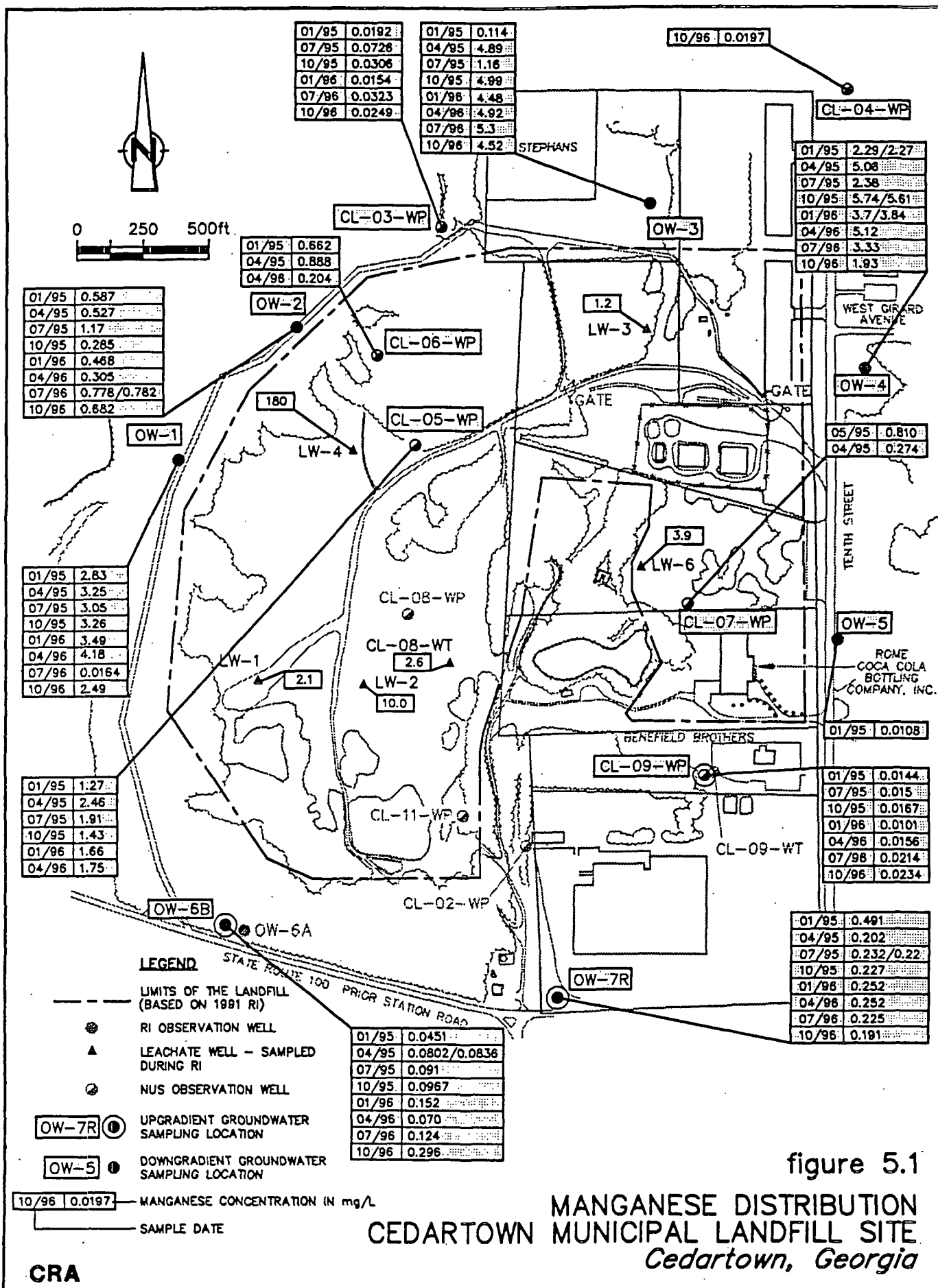
Photograph: Monitoring Well OW-4

Project Name: Cedartown Municipal Landfill Superfund Site

Attachment C

Pertinent Data From Two-Year Review Report





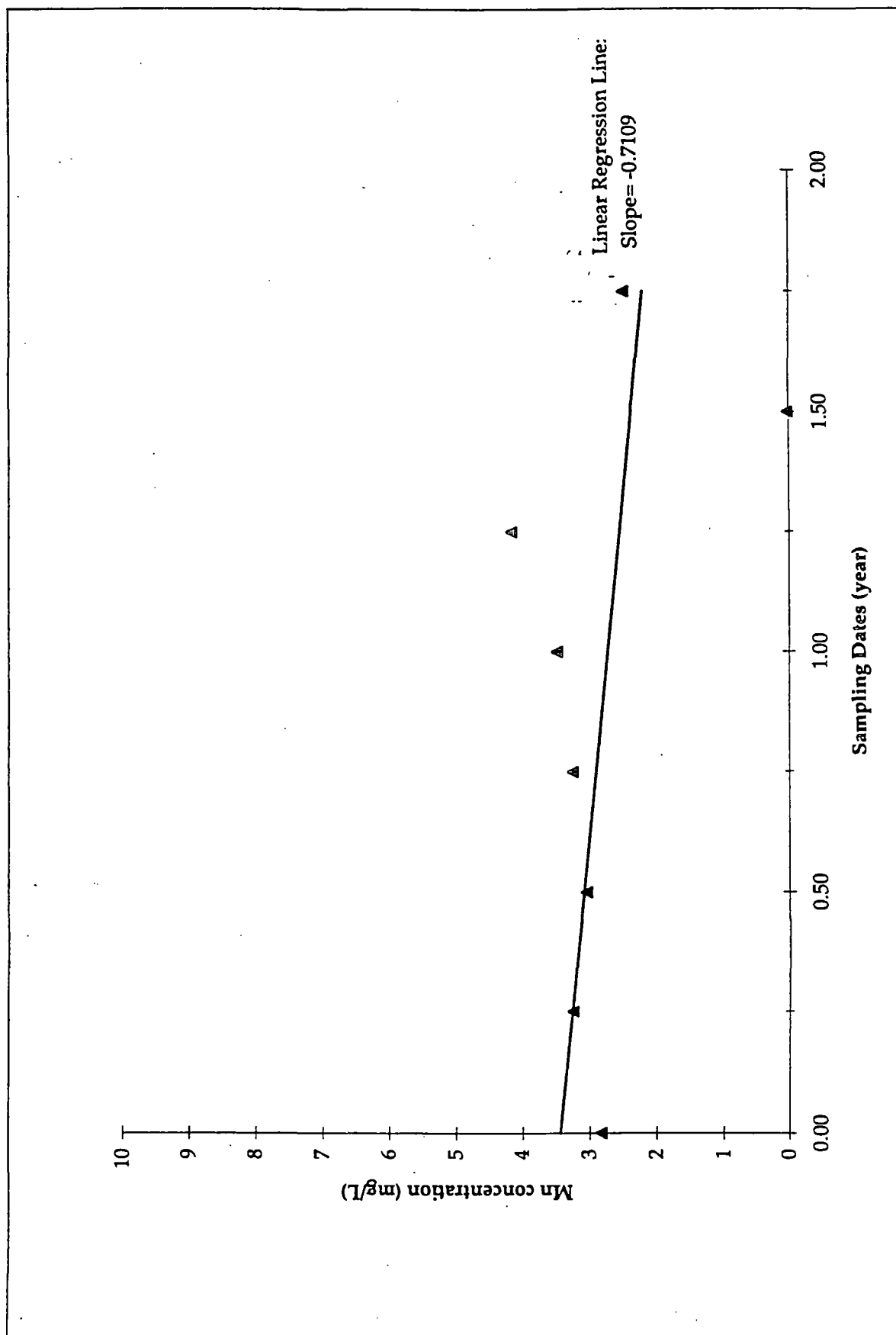


Figure 6.1
Manganese Concentration vs. Time -OW-1
Cedartown Municipal Landfill Site
Cedartown, Georgia

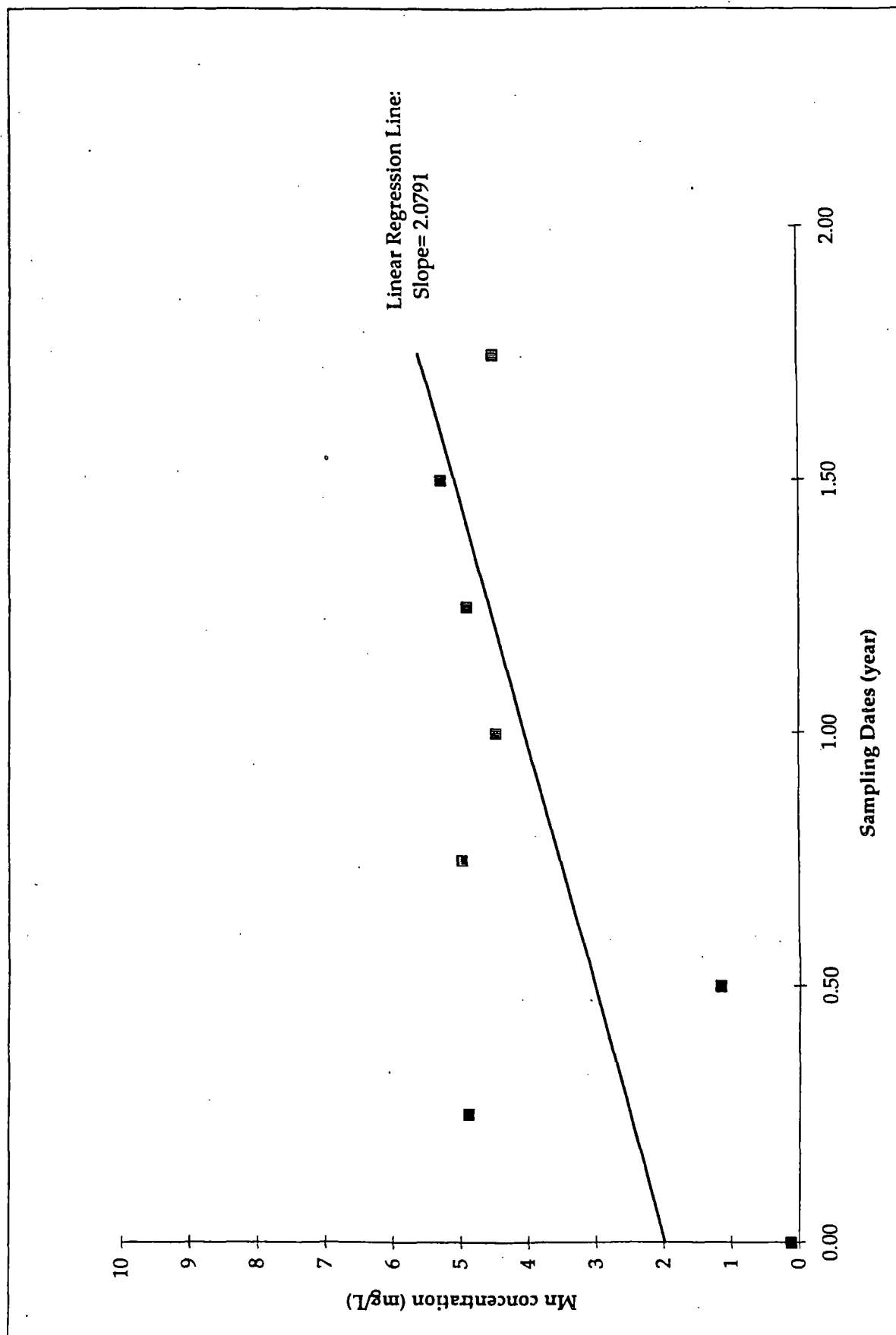


Figure 6.2
Manganese Concentration vs. Time-OW-3
Cedartown Municipal Landfill Site
Cedartown, Georgia

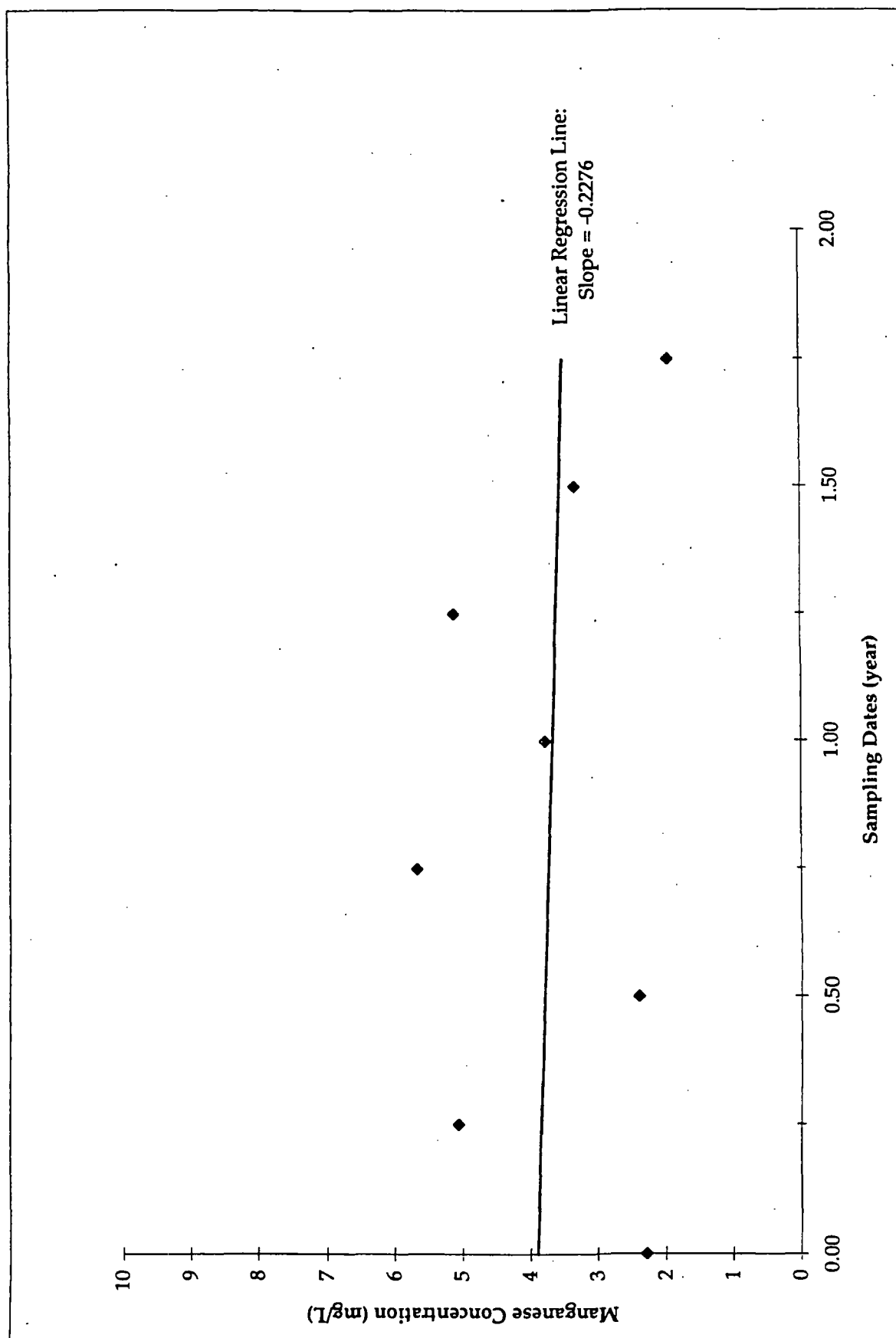


Figure 6.3
Manganese Concentration vs. Time- OW-4
Cedartown Municipal Landfill Site
Cedartown, Georgia

TABLE 3.1

**CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA**

| Well Number | Ground Elevation (Ft. AMSL) (1) | Top of Well Elevation (Ft. AMSL) | Screened Interval | | Bottom of Well | | Screened Interval Lithologic Material |
|----------------|---------------------------------------|---|-------------------------|--------------------|-------------------------|--------------------|--|
| | | | Elevation (Ft. AMSL) | Depth (Ft. BGS) | Elevation (Ft. AMSL) | Depth (Ft. BGS) | |
| OW-1 | 820.79 | 823.80 | 761.79-771.79 | 49.0-59.0 | 760.79 | 60.0 | Dolostone |
| OW-2 | 824.45 | 827.50 | 767.45-782.45 | 42.0-57.0 | 764.45 | 60.0 | Dolostone |
| OW-3 | 801.50 | 803.29 | Open Hole | | 608.50 | 193.0 (3) | Limestone |
| OW-4 | 799.00 | 801.52 | 739.0-749.0 | 50.0-60.0 | 730.00 | 69.0 | Limestone |
| OW-5 | 795.42 | 797.92 | 712.42-732.42 | 63.0-83.0 | 710.42 | 85.0 | Limestone |
| OW-6B | 804.12 | 805.12 | Open Hole | | 696.12 | 108.0 (4) | Limestone |
| OW-7R | 806.70 | 809.30 | 724.70-734.70 | 72.0-82.0 | 724.70 | 88.0 | Siderite |
| CL-03-WP (5) | 833.60 | 836.41 | 736.1-751.1 | 82.5-97.5 | 735.60 | 98.0 | Clay/limestone |
| CL-04-WP (5) | 796.81 | 796.81 | 755.31-765.31 | 31.5-41.5 | 754.81 | 42.0 | Limestone |
| CL-05-WP (5) | 850.10 | 853.34 | 733.6-743.6 | 106.5-116.5 | 733.10 | 117.0 | Limestone |
| CL-06-WP (5) | 857.40 | 861.02 | 770.4-780.4 | 77.0-87.0 | 769.90 | 87.5 | Limestone |
| CL-07-WP (5) | 823.30 | 824.90 | 793.3-803.3 | 20.0-30.0 | 792.80 | 30.5 | Limestone |
| CL-09-WP (5) | 802.40 | 803.63 | 770.9-780.9 | 21.5-31.5 | 770.40 | 32.0 | Limestone |

Notes:

- (1) AMSL - above mean sea level
- (2) BGS - below ground surface
- (3) Well has since collapsed to 646.50 Ft. AMSL or 155 Ft. BGS.
- (4) Well has since collapsed to 752.12 Ft. AMSL or 52.0 Ft. BGS.
- (5) Source: NUS Corporation

TABLE 4.1

GROUNDWATER ELEVATION SUMMARY
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

| Monitoring Well | Monitoring Well Classification | Reference Elevation | Water Level Elevations (1) | | | | | |
|-----------------|--------------------------------|---------------------|----------------------------|---------------|--------------|------------|-----------|--------------|
| | | | October 1991 | December 1991 | January 1995 | April 1995 | July 1995 | October 1995 |
| OW-1 | P | 823.80 | 773.35 | 779.88 | 786.26 | 787.35 | 778.35 | 784.60 |
| OW-2 | P | 827.50 | 769.15 | 774.16 | 780.05 | 779.81 | 772.92 | 779.48 |
| OW-3 | P | 803.29 | 764.09 | 771.89 | 773.79 | 779.08 | 764.97 | 773.81 |
| OW-4 | P | 801.52 | 759.12 | 763.77 | 763.10 | 764.98 | 759.17 | 765.45 |
| OW-5 | P | 797.92 | 773.27 | 774.72 | 774.64 | 776.58 | 773.42 | 774.56 |
| OW-6B | B | 805.12 | 777.21 | 781.28 | 785.35 | 791.00 | 779.94 | 786.62 |
| OW-7R | B | 809.30 | — (4) | — (4) | 784.48 | 788.75 | 783.52 | 784.70 |
| CL-03-WP | P | 836.41 | 775.99 | 777.01 | 786.54 | 791.47 | 781.31 | 785.41 |
| CL-04-WP | P | 796.81 | 757.28 | 776.39 | 761.33 | 764.30 | 756.59 | 763.50 |
| CL-05-WP | I | 853.34 | — (3) | — (3) | 780.22 | 783.40 | 777.99 | 778.23 |
| CL-06-WP | I | 861.02 | — (3) | — (3) | 776.80 | 773.38 | — (2) | 776.18 |
| CL-07-WP | I | 824.90 | — (3) | — (3) | 801.09 | 801.42 | 792.75 | 792.75 |
| CL-09-WP | D | 803.18 | 783.18 | 790.91 | 788.74 | 794.96 | 785.03 | 790.28 |

Notes:

- (1) Elevations are feet above mean sea level.
 (2) Dry.
 (3) Not sampled.
 (4) OW-7R installed during RD.
 P - Perimeter monitoring well
 B - Background monitoring well
 I - Interior monitoring well

TABLE 4.1

GROUNDWATER ELEVATION SUMMARY
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

| Monitoring Well | Monitoring Well Classification | Reference Elevation | Water Level Elevations (1) | | | |
|--------------------|--------------------------------------|------------------------|----------------------------|------------|-----------|--------------|
| | | | January 1996 | April 1996 | July 1996 | October 1996 |
| OW-1 | P | 823.80 | 786.15 | 787.60 | 781.59 | 781.25 |
| OW-2 | P | 827.50 | 781.15 | 782.47 | 776.69 | 776.61 |
| OW-3 | P | 803.29 | 776.87 | 778.90 | 768.90 | 768.36 |
| OW-4 | P | 801.52 | 766.45 | 768.47 | 762.06 | 761.92 |
| OW-5 | P | 797.92 | 774.99 | 776.34 | 774.43 | 774.25 |
| OW-6B | B | 805.12 | 789.14 | 792.84 | 783.82 | 783.12 |
| OW-7R | B | 809.30 | 787.35 | 790.98 | 787.35 | 786.14 |
| CL-03-WP | P | 836.41 | 789.95 | 790.89 | 785.33 | 785.01 |
| CL-04-WP | P | 796.81 | 767.81 | 766.61 | 760.41 | 758.04 |
| CL-05-WP | I | 853.34 | 782.22 | 786.69 | -- (3) | -- (3) |
| CL-06-WP | I | 861.02 | 777.78 | 775.16 | -- (3) | -- (3) |
| CL-07-WP | I | 824.90 | 792.81 | 800.44 | -- (3) | -- (3) |
| CL-09-WP | D | 803.18 | 793.95 | 796.62 | 788.73 | 788.42 |

Notes:

(1) Elevations are feet above mean sea level.

(2) Dry.

(3) Not sampled.

P - Perimeter monitoring well

B - Background monitoring well

I - Interior monitoring well

TABLE 5.1

GROUNDWATER METALS RESULTS FOR BACKGROUND MONITORING WELLS
 REMEDIAL ACTION GROUNDWATER MONITORING
 CEDARTOWN MUNICIPAL LANDFILL SITE
 CEDARTOWN, GEORGIA

| Location: | | CL-09-WP | | | | | | | | | |
|---------------|------|----------------------|------------------------|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|-------------------------------|-----------------------|------------|
| Sample ID: | | W-3482-JOS-010695-07 | GW-3482-JOS-042695-022 | GW-3482-JOS-072195-09 | GW-3482-JOS-102695-11 | GW-3482-JOS-010296-04(MS/MSD) | GW-3482-JOS-042496-14 | GW-3482-JOS-071096-09 | GW-3482-JOS-102396-02(MS/MSD) | | |
| Date Sampled: | | 1/6/95 | 4/26/95 | 7/21/95 | 10/26/95 | 1/2/96 | 4/24/96 | 7/10/96 | 10/23/96 | | |
| Parameters | | Units | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | | |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | | |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | | |
| Lead | mg/L | ND(0.005) | ND(0.0030) | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | | |
| Manganese | mg/L | 0.0144 | ND(0.0100) | 0.015 | 0.0167 | 0.0101 | 0.0156 | 0.0214 | 0.0234 | | |
| Location: | | OW-7R | | | | | | | | | |
| Sample ID: | | W-3482-JOS-012395-15 | GW-3482-JOS-042895-023 | GW-3482-JOS-071995-01 | GW-3482-JOS-071995-02 | GW-3482-JOS-102495-03 | GW-3482-JOS-010396-05 | GW-3482-JOS-042496-11 | GW-3482-JOS-071096-05 | GW-3482-JOS-102496-07 | |
| Date Sampled: | | 1/23/95 | 4/28/95 | 7/19/95 | 7/19/95 | 10/24/95 | 1/3/96 | 4/24/96 | 7/10/96 | 10/24/96 | |
| Parameters | | Units | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Chromium | mg/L | 0.0101 | ND(0.0100) | ND(0.01) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) |
| Lead | mg/L | 0.011 | ND(0.0030) | ND(0.003) | ND(0.003) | ND(0.0030) | ND(0.0300) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| Manganese | mg/L | 0.491 | 0.202 | 0.232 | 0.22 | 0.227 | 0.252 | 0.252 | 0.225 | 0.191 | |

Note:

ND - Not detected at the reporting limit stated in parentheses.

TABLE 5.1

GROUNDWATER METALS RESULTS FOR BACKGROUND MONITORING WELLS
 REMEDIAL ACTION GROUNDWATER MONITORING
 CEDARTOWN MUNICIPAL LANDFILL SITE
 CEDARTOWN, GEORGIA

| Location: | | OW-6B | | | | | | | | | |
|---------------|-------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Sample ID: | | W-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- |
| Date Sampled: | | 010595-02 | 042595-017 | 042595-18 | 072395-011 | 102695-13 | 010396-06 | 042496-12 | 071196-12 | 102896-12 | |
| | | 1/5/95 | 4/25/95 | 4/25/95 | 7/23/95 | 10/26/95 | 1/3/96 | 4/24/96 | 7/11/96 | 10/28/96 | |
| Parameters | Units | | | (Dup) | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | 0.0162 | |
| Lead | mg/L | ND(0.005) | 0.0050 | 0.0048 | ND(0.003) | ND(0.0030) | 0.0042 | 0.0036 | ND(0.0030) | ND(0.0030) | |
| Manganese | mg/L | 0.0451 | 0.0802 | 0.0836 | 0.091 | 0.0967 | 0.152 | 0.070 | 0.124 | 0.296 | |

Note:

ND - Not detected at the reporting limit stated in parentheses.

**GROUNDWATER METALS RESULTS FOR INTERIOR MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA**

| Location: | | CL-05-WP | | | | | |
|-------------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Sample ID: | | W-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- |
| Date Sampled: | | 011095-11 | 042895-027 | 072195-08 | 102695-10 | 010496-13 | 042396-08 |
| | | 1/10/95 | 4/28/95 | 7/21/95 | 10/26/95 | 1/4/96 | 4/23/96 |
| <u>Parameters</u> | <u>Units</u> | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) |
| Lead | mg/L | ND(0.003) | ND(0.0030) | 0.003 | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| Manganese | mg/L | 1.27 | 2.46 | 1.91 | 1.43 | 1.66 | 1.75 |

| Location: | | CL-06-WP | | | CL-07-WP | | |
|-------------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Sample ID: | | W-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- | GW-3482-JOS- |
| Date Sampled: | | 011195-14 | 042795-026 | 042396-07 | 050295-029 | 042496-15 | 042496-15 |
| | | 1/11/95 | 4/27/95 | 4/23/96 | 5/2/95 | 4/24/96 | 4/24/96 |
| <u>Parameters</u> | <u>Units</u> | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Chromium | mg/L | 0.423 | 0.173 | 0.0103 | 0.230 | 0.398 | 0.398 |
| Lead | mg/L | ND(0.003) | 0.0046 | ND(0.0030) | 0.0268 | 0.0113 | 0.0113 |
| Manganese | mg/L | 0.662 | 0.888 | 0.204 | 0.810 | 0.274 | 0.274 |

ND - Not detected at the reporting limit stated in parentheses.

TABLE 5.3

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

| Location: | | OW-1 | | | | | | | | | |
|---------------|-------|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Sample ID: | | W-3482-JOS-011095-09 | W-3482-JOS-051095-028 | W-3482-JOS-072095-05 | W-3482-JOS-102495-04 | W-3482-JOS-010396-10 | W-3482-JOS-042396-05 | W-3482-JOS-072696-01 | W-3482-JOS-102596-10 | W-3482-JOS-102596-10 | W-3482-JOS-102596-10 |
| Date Sampled: | | 1/10/95 | 5/10/95 | 7/20/95 | 10/24/95 | 1/3/96 | 4/23/96 | 7/26/96 | 10/25/96 | 10/25/96 | 10/25/96 |
| Parameters | Units | | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | 0.0104 | ND(0.0100) | ND(0.0100) | ND(0.0100) |
| Lead | mg/L | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| Manganese | mg/L | 2.83 | 3.25 | 3.05 | 3.26 | 3.49 | 4.18 | 0.0164 | 2.49 | 2.49 | 2.49 |

| Location: | | OW-2 | | | | | | | | | |
|---------------|-------|----------------------|-----------------------|----------------------|----------------------|----------------------|------------------------------|----------------------|----------------------|----------------------|----------------------|
| Sample ID: | | W-3482-JOS-010595-01 | W-3482-JOS-042795-025 | W-3482-JOS-072095-06 | W-3482-JOS-102395-02 | W-3482-JOS-010396-09 | W-3482-JOS-042396-06(MS/MSD) | W-3482-JOS-071096-06 | W-3482-JOS-071096-07 | W-3482-JOS-102496-06 | W-3482-JOS-102496-06 |
| Date Sampled: | | 1/5/95 | 4/27/95 | 7/20/95 | 10/23/95 | 1/3/96 | 4/24/96 | 7/10/96 | 7/10/96 (Dup) | 10/24/96 | 10/24/96 |
| Parameters | Units | | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) |
| Lead | mg/L | ND(0.005) | ND(0.0030) | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| Manganese | mg/L | 0.587 | 0.527 | 1.17 | 0.285 | 0.468 | 0.305 | 0.778 | 0.782 | 0.682 | 0.682 |

ND - Not detected at the reporting limit stated in parentheses.

TABLE 53

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

| Location: | | OW-3 | | | | | | | | | |
|---------------|-------|----------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Sample ID: | | W-3482-JOS-010955-10 | GW-3482-JOS-042655-024 | W-3482-JOS-072295-010 | GW-3482-JOS-102695-012 | GW-3482-JOS-010496-11 | GW-3482-JOS-042396-10 | GW-3482-JOS-071196-11 | GW-3482-JOS-102496-09 | GW-3482-JOS-102496-09 | |
| Date Sampled: | | 1/10/95 | 4/26/95 | 7/22/95 | 10/26/95 | 1/4/96 | 4/23/96 | 7/11/96 | 10/24/96 | 10/24/96 | |
| Parameters | Units | | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | |
| Lead | mg/L | ND(0.003) | ND(0.0030) | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | |
| Manganese | mg/L | 0.114 | 4.89 | 1.16 | 4.99 | 4.48 | 4.92 | 5.3 | 4.52 | 4.52 | |
| Location: | | OW-4 | | | | | | | | | |
| Sample ID: | | W-3482-JOS-010695-04 | W-3482-JOS-010695-05 | GW-3482-JOS-042595-019 | W-3482-JOS-071995-04 | GW-3482-JNP-102595-06 | GW-3482-JNP-102595-06 | GW-3482-JOS-010296-02 | GW-3482-JOS-042196-13 | GW-3482-JOS-070996-02 | GW-3482-JOS-102396-05 |
| Date Sampled: | | 1/6/95 | 1/6/95 | 4/25/95 | 7/19/95 | 10/25/95 | 10/25/95 | 1/2/96 | 4/24/96 | 7/9/96 | 10/23/96 |
| Parameters | Units | | (Dup) | | | | (Dup) | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Cadmium | mg/L | ND(0.005) | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) |
| Chromium | mg/L | ND(0.01) | ND(0.01) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) |
| Lead | mg/L | ND(0.005) | ND(0.005) | ND(0.0030) | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) |
| Manganese | mg/L | 2.29 | 2.27 | 5.06 | 2.38 | 5.74 | 5.61 | 3.7 | 5.12 | 3.33 | 1.93 |
| Location: | | CL-03-WP | | | | | | | | | |
| Sample ID: | | W-3482-JOS-010995-08 | GW-3482-JOS-042695-021 | W-3482-JOS-071995-03 | GW-3482-JOS-102595-09 | GW-3482-JOS-010396-07 | GW-3482-JOS-042396-09 | GW-3482-JOS-072696-02 | GW-3482-JOS-102596-11 | GW-3482-JOS-102596-11 | |
| Date Sampled: | | 1/9/95 | 4/26/95 | 7/19/95 | 10/25/95 | 1/3/96 | 4/23/96 | 7/26/96 | 10/25/96 | 10/25/96 | |
| Parameters | Units | | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Chromium | mg/L | ND(0.0100) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | |
| Lead | mg/L | ND(0.003) | ND(0.0030) | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | |
| Manganese | mg/L | 0.0192 | ND(0.0100) | 0.0726 | 0.0306 | 0.0154 | ND(0.0100) | 0.0323 | 0.0249 | 0.0249 | |

ND - Not Detected at the reporting limit stated in parentheses.

TABLE 5.3

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

| Location: | | CL-04-WP | | | | | | | | | |
|---------------|-------|----------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|
| Sample ID: | | W-3482-JOS-010695-03 | GW-3482-JOS-042595-016 | GW-3482-JOS-102395-01 | GW-3482-JOS-010796-01 | GW-3482-JOS-041296-02 | GW-3482-JOS-041296-03 | GW-3482-JOS-071096-01 | GW-3482-JOS-102396-01 | GW-3482-JOS-102396-02 | |
| Date Sampled: | | 1/6/95 | 4/25/95 | 10/23/95 | 1/2/96 | 4/22/96 | 4/22/96 (Dup) | 7/9/96 | 10/23/96 | 10/23/96 | |
| Parameters | Units | | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | |
| Lead | mg/L | ND(0.005) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | |
| Manganese | mg/L | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | 0.0197 | |
| Location: | | OW-5 | | | | | | | | | |
| Sample ID: | | W-3482-JOS-010695-06 | GW-3482-JOS-042595-020 | W-3482-JOS-072095-07 | GW-3482-JNP-102595-07 | GW-3482-JOS-010496-12 | GW-3482-JOS-041296-04 | GW-3482-JOS-071096-04 | GW-3482-JOS-102396-03 | GW-3482-JOS-102396-04 | |
| Date Sampled: | | 1/6/95 | 4/25/95 | 7/20/95 | 10/25/95 | 1/4/96 | 4/22/96 | 7/10/96 | 10/23/96 | 10/23/96 (DUP) | |
| Parameters | Units | | | | | | | | | | |
| Beryllium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Cadmium | mg/L | ND(0.005) | ND(0.0050) | ND(0.005) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | ND(0.0050) | |
| Chromium | mg/L | ND(0.01) | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | |
| Lead | mg/L | ND(0.005) | ND(0.0030) | ND(0.003) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | ND(0.0030) | |
| Manganese | mg/L | 0.0108 | ND(0.0100) | ND(0.01) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | ND(0.0100) | |

ND - Not detected at the reporting limit stated in parentheses.